Development and application of a new drought severity index for categorizing drought-prone areas: a case study of undivided Andhra Pradesh state, India

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Abstract

The state of undivided Andhra Pradesh, India, spent around US$ 20 million per annum on drought relief programs during the period 1998–2008. However, till date, no long-term drought plans are in place due to poor availability of information on drought severity at each mandal or county level. For assessing the vulnerability of mandals to different drought intensities, a simple and novel drought severity index called CRIDA Drought Severity Index, named after the affiliated institute, was developed. This index takes into account frequency and intensity of agricultural droughts at mandal level. The frequency and intensity were estimated using average moisture adequacy index (MAI) during the crop growing season for each mandal. The years with average MAI during crop season of > 0.75, < 0.75 to > 0.50, < 0.50 to > 0.25, and < 0.25 were classified as no drought, mild, moderate, and severe drought years, respectively. All the 1099 rural mandals of the state were categorized into four classes, viz. safe, less vulnerable, moderately vulnerable, and highly vulnerable. The spatial depiction of vulnerability of mandals to any of these four classes of agricultural droughts (using GIS), with and without considering the irrigation potential of these mandals showed that the south and southwestern regions of the state with low rainfall, poor water-holding capacity of soils, and limited irrigation potential are highly vulnerable to agricultural droughts. The methodology adopted may serve as a model for assessing drought vulnerability and planning of mitigation measures in other drought-prone states or countries.